

A Summary of Essential Abstractions

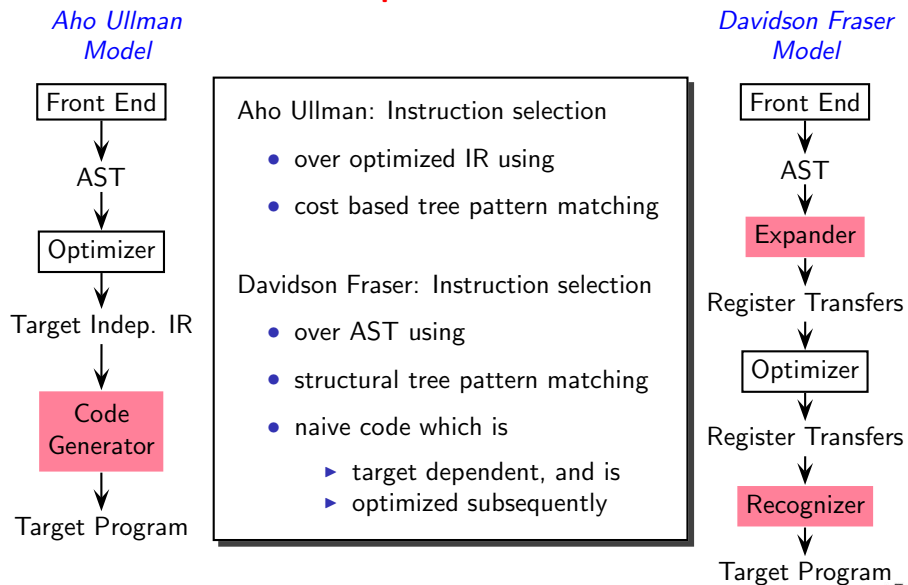
GCC Resource Center
(www.cse.iitb.ac.in/grc)

Department of Computer Science and Engineering,
Indian Institute of Technology, Bombay



3 July 2011

Compilation Models

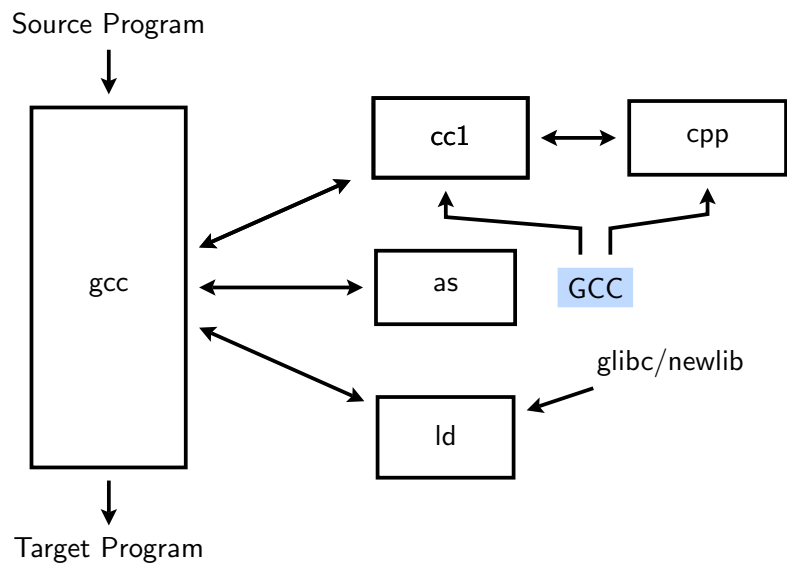


Compilation Models

Notes



The GNU Tool Chain

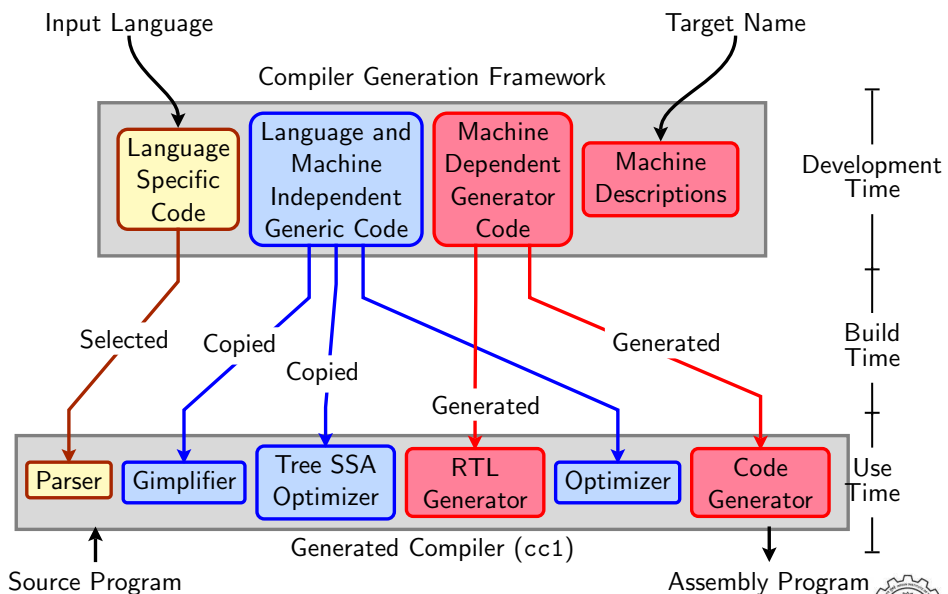


The GNU Tool Chain

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The Architecture of GCC

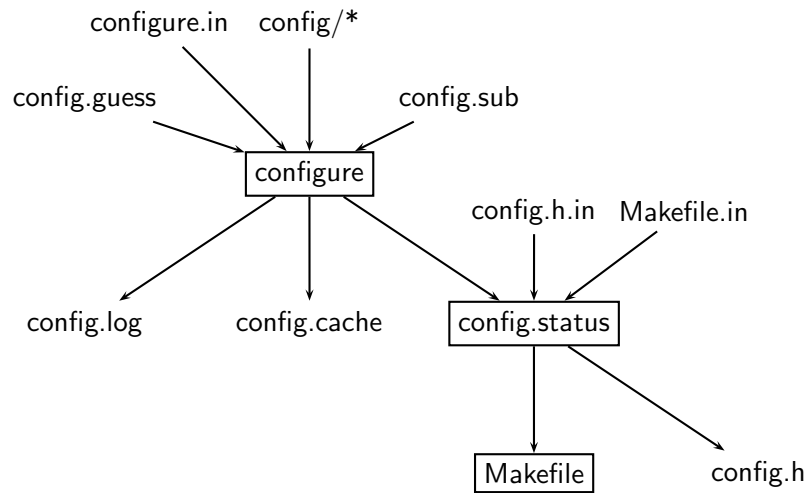


The Architecture of GCC

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Configuring GCC

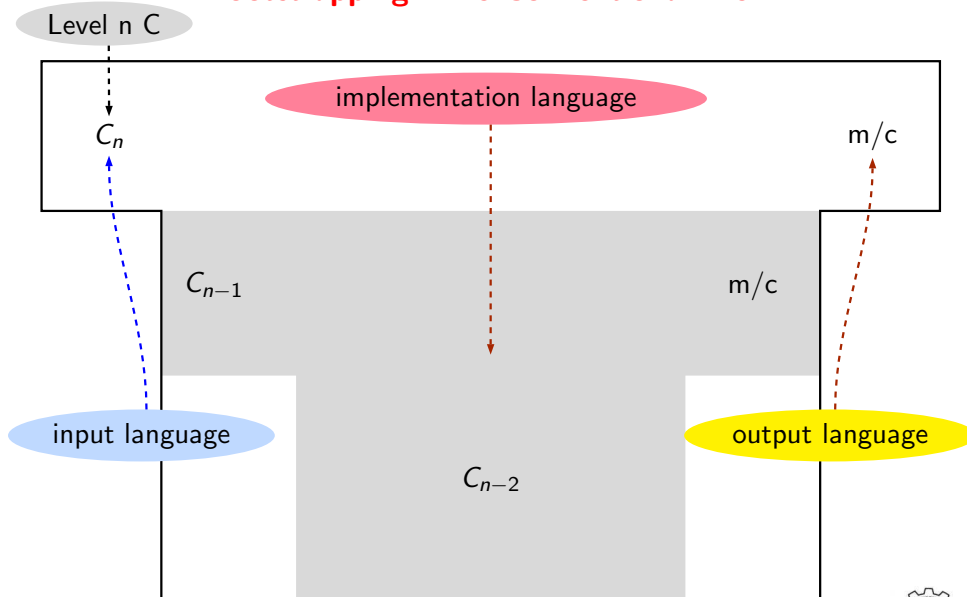


Configuring GCC

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Bootstrapping: The Conventional View

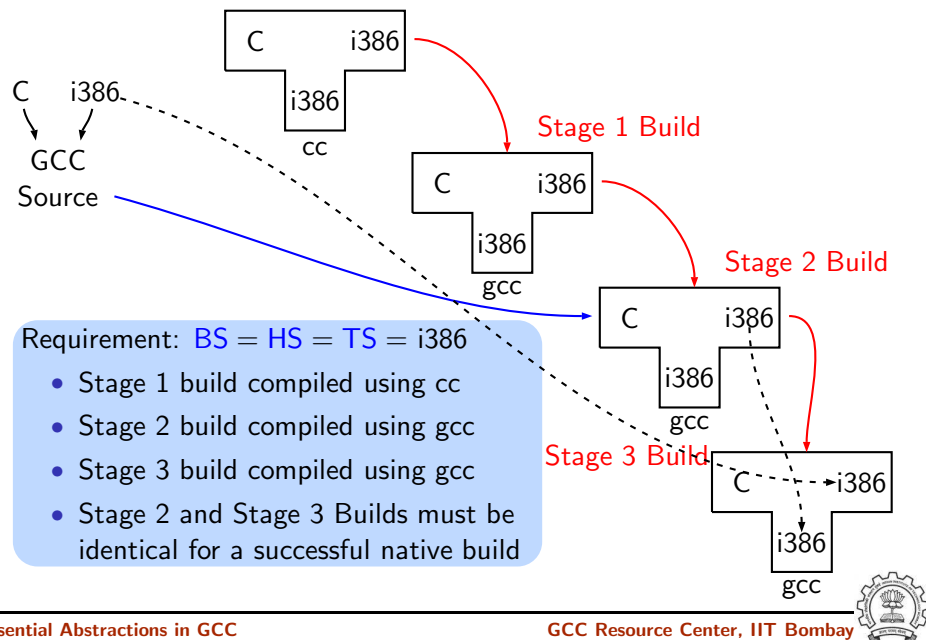


Bootstrapping: The Conventional View

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A Native Build on i386



A Native Build on i386

Notes



Build for a Given Machine

This is what actually happens!

- Generation
 - ▶ Generator sources ($\$(SOURCE_D)/gcc/gen*.c$) are read and generator executables are created in $\$(BUILD)/gcc/build$
 - ▶ MD files are read by the generator executables and back end source code is generated in $\$(BUILD)/gcc$
- Compilation

Other source files are read from $\$(SOURCE_D)$ and executables created in corresponding subdirectories of $\$(BUILD)$
- Installation

Created executables and libraries are copied in $\$(INSTALL)$

```
genattr
gencheck
genconditions
genconstants
genflags
genopinit
genpreds
genattrtab
genchecksum
gencondmd
genemit
gengenrtl
genmddeps
genoutput
genrecog
genautomata
gencodes
genconfig
genextract
gengtype
genmodes
genpeep
```

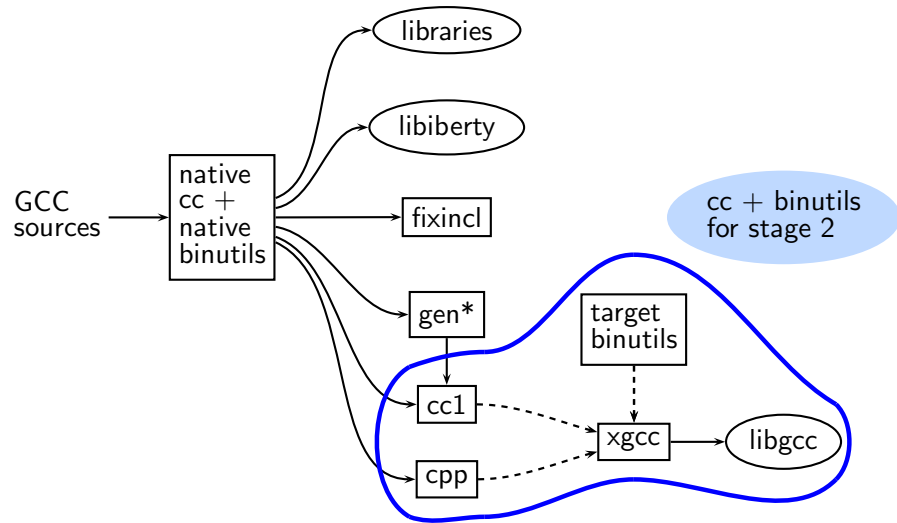


Build for a Given Machine

Notes



More Details of an Actual Stage 1 Build for C



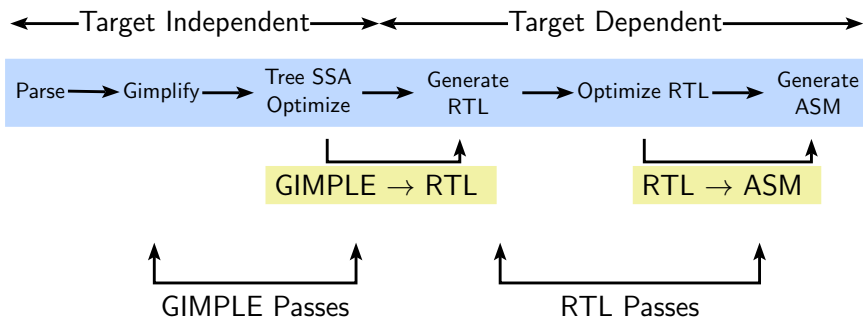
More Details of an Actual Stage 1 Build for C

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Basic Transformations in GCC

Transformation from a language to a *different* language

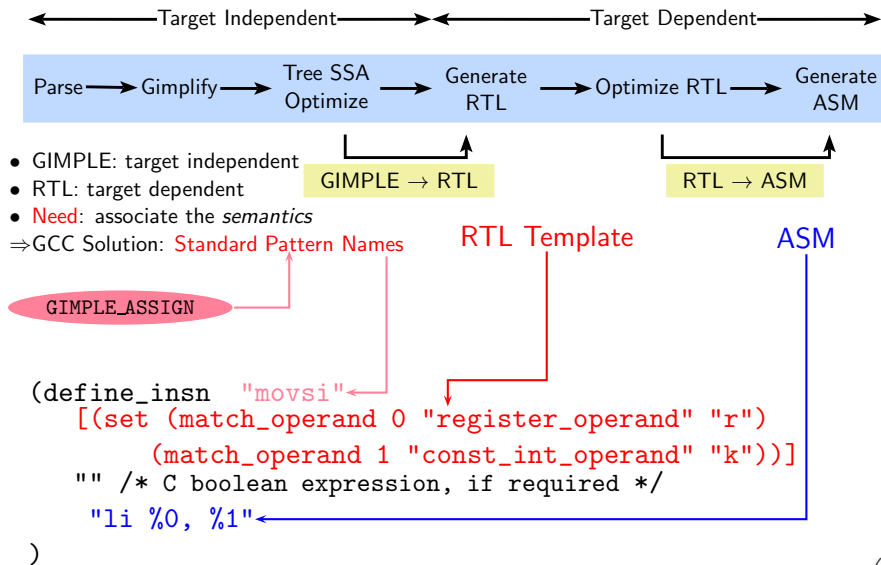


Basic Transformations in GCC

Notes



Instruction Specification and Translation: A Recap



Translation Sequence in GCC

```

(define_insn
  "movsi"
  [(set
    (match_operand 0 "register_operand" "r")
    (match_operand 1 "const_int_operand" "k"))]
  "" /* C boolean expression, if required */
  "li %0, %1"
)
  
```

Development

D.1283 = 10;

```

(set
  (reg:SI 58 [D.1283])
  (const_int 10: [0xa])
)
  
```

li \$t0, 10

Use



Instruction Specification and Translation: A Recap

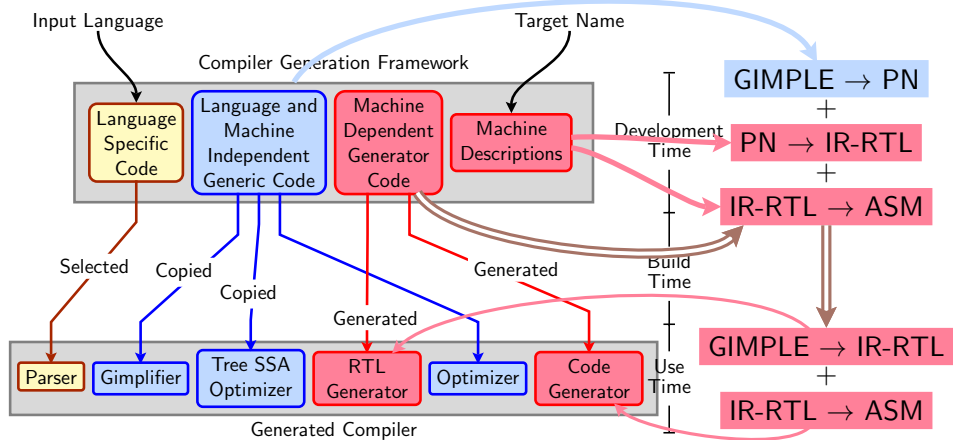
Notes

Translation Sequence in GCC

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Retargetability Mechanism of GCC

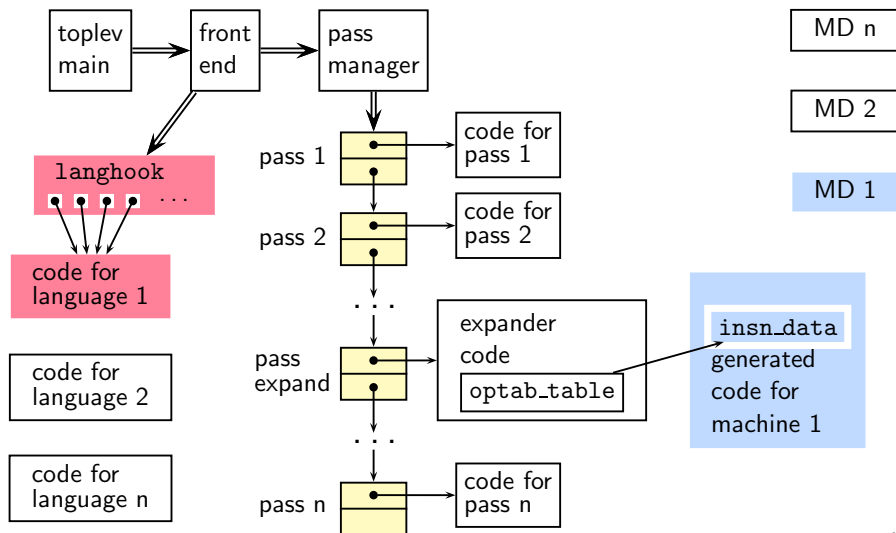


Retargetability Mechanism of GCC

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Plugin Structure in cc1

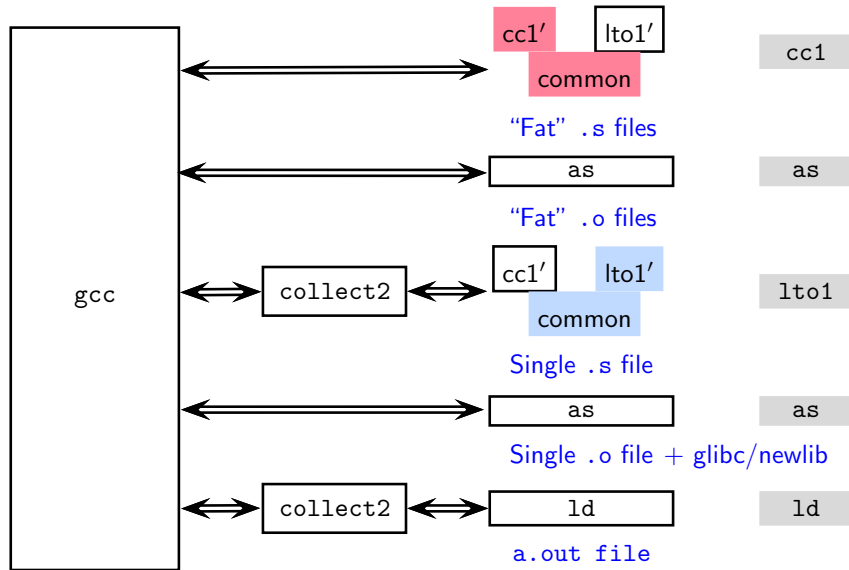


Plugin Structure in cc1

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The GNU Tool Chain for LTO Support

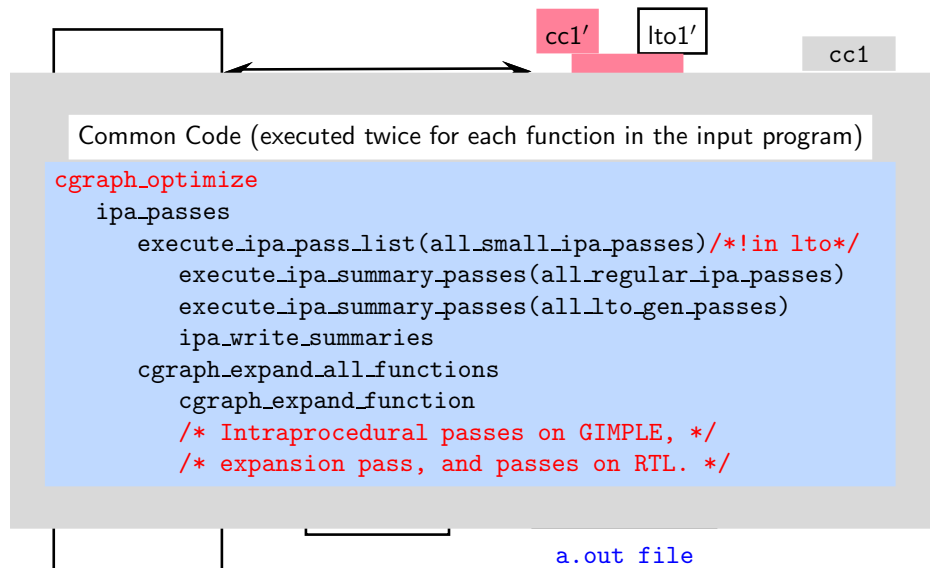


The GNU Tool Chain for LTO Support

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The GNU Tool Chain for LTO Support

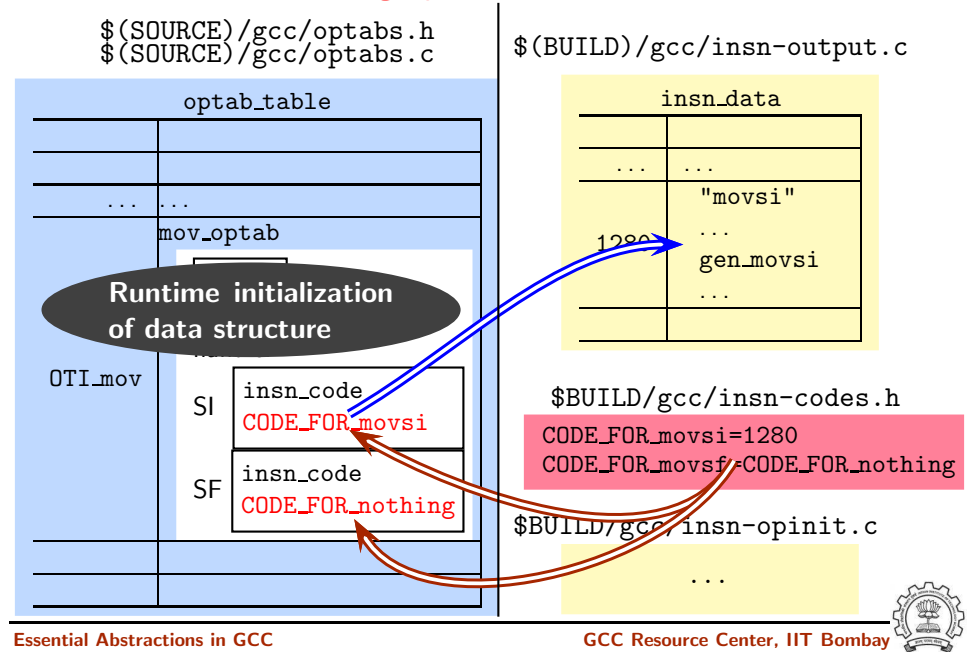


The GNU Tool Chain for LTO Support

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Hooking up Back End Details



Hooking up Back End Details

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